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Frequency of Dry Eyes with and without Posterior Blepharitis in Diabetes Patients

Mahum Faheem, Syed Abid, Hassan Naqvi*, Haroon Sarfaraz, Farooq ul Abidin**

Armed Forces Institute of Ophthalmology/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, *Combined Military Hospital Quetta/National University of Medical Sciences (NUMS) Pakistan, **POF Hospital/Wah Medical College, Wah/National University of Medical Sciences, Rawalpindi Pakistan

ABSTRACT

Objective: To assess the frequency of dry eyes with and without posterior blepharitis in diabetic patients managed in our hospital.

Study Design: Cross-sectional study.

Place and Duration of Study: Armed Forces Institute of Ophthalmology, Rawalpindi Pakistan from Feb to Jun 2021.

Methodology: A total of 160 patients suffering from type-2 Diabetes Mellitus with blood sugar fasting of more than 126mg/dl were included in the study. Dry eyes were assessed with Tear break up time tests and Schirmer. A consultant ophthalmologist conducted a detailed ophthalmological examination to diagnose posterior blepharitis among the study participants.

Results: There were 160 patients enrolled in this study. The mean age was 52.68±11.8 years. The study included 74(46.3%) male and 86(53.8%) female patients. It was found that tear-breaking time was significantly lower for diabetic patients with blepharitis as compared to diabetic patients without blepharitis (p<0.001). Similarly, the duration of diabetes was also found to be associated with tear breakup time. Patients who had diabetes for more than ten years were more likely to have a tear breakup time of fewer than 10 seconds compared to patients who had diabetes for not more than ten years (p<0.001).

Conclusion: Dry eye syndrome was common among patients suffering from type-2 diabetes mellitus. Patients with longstanding diabetes or those with posterior blepharitis were more at risk of dry eyes than those without posterior blepharitis or a shorter duration of diabetes mellitus.

Keywords: Dry eyes, Posterior blepharitis, Type 2 diabetes mellitus.

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INTRODUCTION

Ocular manifestations of systemic diseases have always been an area of interest for clinicians and researchers related to ophthalmology and medicine.[1] Few systemic illnesses directly involve the eyes as part of the primary disease process, while others predispose the individual to develop ocular complications.[2,3] It becomes very important for treating eye specialists to have adequate knowledge of these diseases to manage such patients with a holistic approach.

Diabetes Mellitus is a multisystem disorder commonly involving the eyes of the patients during illness.[4] Usually, retinopathies related to this disease have been emphasised by clinicians. However, recent surveys have shown that many other ocular conditions are commonly found in patients suffering from long-standing type-2 diabetes mellitus.[5] They include both infective and inflammatory conditions and are related to the control of underlying diabetes mellitus.[6]

Ocular health among patients who have diabetes has been discussed in various studies done in the recent past. Skarbez *et al*. highlighted that dry eyes and blepharitis could be seen commonly among patients with long-standing diabetes mellitus along with multiple other ocular pathologies.[7] Rocha *et al.* came up with the same idea and summarized that blepharoptosis, blepharitis, xanthomas, increased tear-film glucose levels, and calcification of the trochlear apparatus may be some of milder ocular manifestations of diabetes mellitus while third, fourth, and sixth cranial neuropathies and rhinocerebral mucormycosis may be more serious ones.[8] Ansari *et al.* concluded that conjunctivitis and blepharitis were more common in those with type 1 diabetes mellitus.[9]

Diabetes is a very commonly diagnosed metabolic disorder in our world. Usually, clinicians focus more on the control of diabetes and prevention of systemic complications, as eye specialists are seldom available in primary care facilities. However, dry eye syndrome has also been seen commonly in our population. A local study performed by Samina Jehangir published in the Journal of Pakistan Medical Association concluded that 10% of the patients with dry eye syndrome had blepharitis as well.[10] Limited local data has been generated regarding the presence of dry eye syndrome and its relationship with blepharitis among patients who have diabetes. Therefore, we planned this study

Correspondence: Dr Mahum Faheem, Armed Forces Institute of Ophthalmology, Rawalpindi, Pakistan

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to assess the frequency of dry eyes with and without posterior blepharitis in diabetic patients managed in our hospital.

METHODOLOGY

This cross-sectional study was conducted at the Armed Forces Institute of Ophthalmology, Rawalpindi Pakistan from February to June 2021 after ethical approval from the Ethical Review Board Committee (Letter No. 224) data was collected. The sample size was calculated with the help of the WHO sample size calculator by taking the population prevalence of dry eyes among patients of diabetes as 60% and keeping the margin of error at 10%.[11] Non-probability consecutive sampling technique was used to gather the sample size for this study.

Inclusion Criteria: All the patients aged between 25 to 65 years with a diagnosis of type-2 diabetes mellitus and blood sugar fasting levels of more than 126 mg/dl were included in the study.

Exclusion Criteria: Patients with type-I diabetes, contact lens wearers and those who have active fungal infections were excluded from the study. Patients who were pregnant or had gestational diabetes were also not included in the study. Patients with a history of recent trauma to the eye or any ophthalmic surgeries were excluded as well.

After written informed consent from the potential participants, patients fulfilling the above mentioned inclusion criteria were included in the study. A consultant ophthalmologist performed a detailed ophthalmological examination on all the study participants, including a slit lamp examination. In addition, dry eyes were assessed with Tear break up time tests and Schirmer.[12] Posterior blepharitis was diagnosed by a consultant ophthalmologist based on detailed clinical examination.[13] Duration of diabetes was classed as patients having type-2 diabetes for more or less than ten years. Data was collected on a structured proforma specially designed for this study.

Data management software Statistical Package for Social Sciences (SPSS-version 21.0) was used to analyze data for this study. Quantitative variables were summarized as Mean±SD and qualitative variables were summarized as frequency and percentages. Chi-square test was applied to find out the association. The *p*-value of ≤0.05 was considered statistically significant.

RESULTS

There were 160 patients enrolled in this study. The mean age was 52.68±11.8 years, with an age range of 25–72 years. The study included 74(46.3%) male and 86(53.8%) female patients. Patients with diabetes were divided into two Groups based on the presence or absence of blepharitis. About 86(53.7%) patients were diagnosed with diabetes mellitus less than ten years ago, whereas the remaining 74(46.2%) were diabetic for more than ten years. There were 80 patients in each group. Group-A included diabetic patients with blepharitis, while diabetic patients without blepharitis belonged to Group-B. Demographic characteristics among the two groups were summarized in Table-I.

Table-I: Comparison of Demographic Characteristics among Patients with and without Blepharitis (n=160)

Characteristics	Patients With Type 2 Diabetes	
	With Blepharitis (n=80)	Without Blepharitis (n=80)
Age in years (Mean±SD)	52.13±11.8	53.24±11.8
Gender		
Male	42 (52.5%)	32 (40.0%)
Female	38 (47.5%)	48 (60.0%)
Duration of diabetes		
Less than 10 years	45 (56.3%)	41 (51.2%)
More than 10 years	35 (43.7%)	39 (48.8%)

Table-II showed that more patients with blepharitis had more than 10 seconds of tear-breaking time than patients without blepharitis (*p*-value<0.001).

Table-II: Comparison of Tear Break-Up Time among Diabetic Patients with or without Blepharitis (n=160)

		Patients With Type 2 Diabetes		*p*-value
		With Blepharitis (n=80)	Without Blepharitis (n=80)	
Tear Break-Up Time	Less Than 10 Seconds	54 (67.5%)	31 (38.8%)	<0.001
	More Than or Equal to 10 Seconds	26 (32.5%)	49 (61.3%)	

Similarly, patients who had diabetes for more than ten years were more likely to have a tear breakup time of fewer than 10 seconds compared to patients who had diabetes for not more than ten years (*p*<0.001), as given in Table-III.

DISCUSSION

Type-2 Diabetes mellitus is one of the most commonly diagnosed metabolic conditions across the globe. Pakistan is no exception to this. Many people are suffering from this chronic condition in our country. Still, the prevalence is on the rise.[14] Long

standing diabetes mellitus prone the individual to numerous other medical conditions, including ophthalmological conditions. Much has already been published about diabetic retinopathy, but other ocular diseases related to diabetes are relatively less discussed. We, therefore, conducted this study intending to assess the frequency of dry eyes with and without posterior blepharitis in diabetic patients managed at the Armed Forces Institute of Ophthalmology.

Table-III: Comparison of Tear Break-Up Time with Duration of Diabetes Mellitus (n=160)

		Study Group		*p*-value
		Less Than 10 Years (n=86)	Without More Than 10 Years (n=74)	
Tear Break-Up Time	Less than 10 Seconds	73 (84.9%)	12 (16.2%)	<0.001
	More than or equal to 10 Seconds	13 (15.1%)	62 (83.8%)	

Zhang *et al.*[15] came up with the idea that patients suffering from diabetes mellitus experience consistent hyperglycemia leading to neuropathy, decreased insulin levels, microvasculopathy and systemic hyperosmolar disturbances. All these features may lead to dry eye syndrome in these patients. Many patients in our study also suffered from dry eye syndrome, and the presence of dry eyes was statistically significantly related to the longer duration of type-2 diabetes mellitus. These findings indicate that chronic hyperglycemia is harmful to the eyes in several ways, and ocular health in diabetes involves a holistic approach from physicians and merely looking for and preventing retinopathy is not enough.

Diabetic patients suffering from various ocular health problems have been documented, but little work has been done on the relationship between blepharitis and dry eye syndrome. The study of Rynerson *et al.*[16] is important in this regard. They summarized that dry eye might be the sequel of blepharitis and coined a new term: dry eye blepharitis syndrome. They interestingly correlated the long-standing bacterial infection leading to inflammation and various pathways resulting in dry eye syndrome. Our results in patients with diabetes supported their stance as posterior blepharitis was strongly related to the presence of dry eyes in our sample population. Long-standing diabetes may require prone individuals to acquire bacterial infection, resulting in dry eye syndrome.

Auw-Hädrich *et al.*[17] emphasized the bimodal relationship of these two clinical entities. Hypovolemic and chronic dry eye syndrome may prone individuals to develop blepharitis. We did not establish or inquire about this bimodal relationship in our study. However, we found a statistically significant association between these two ocular pathologies among patients suffering from type-2 diabetes mellitus. More studies on this topic may generate better results and elaborate this association.

Johana et al.18 assessed the Meibomian glands, ocular surface and tear function in patients with type-2 diabetes and studied the correlation between these conditions. They concluded that Meibomian gland dysfunction in type-2 diabetic patients is more severe than in nondiabetic patients. The longer duration of diabetes is associated with major symptoms and changes in Meibomian gland dysfunction. The diabetic group showed major changes in lids and tear function, accounting for evaporative dry eye and presenting a high correlation with Meibomian gland inflammation and obstruction. Our results supported their findings as long duration of diabetes was associated with dry eye syndrome in our study participants as well.

Our data analysis indicated that Diabetes Mellitus patients and retinopathy should be screened for dry eyes. In addition, an interesting relationship was demonstrated between systemic illness and two ophthalmic conditions.

LIMITATIONS OF STUDY

Our study had a few limitations as well. First, the sample was drawn from type 2 diabetes patients reporting to the ophthalmology unit with some eye problems; therefore cannot be generalized to the local population. Posterior blepharitis was diagnosed clinically, and the same consultant was not available to diagnose all the cases, which may have prone the data to some bias. Finally, control of diabetes was not studied in our analysis which may be one of the factors related to ocular abnormalities among these patients.

CONCLUSION

Dry eye syndrome was common among patients suffering from type 2 diabetes mellitus. In addition, patients with long-standing diabetes or those with posterior blepharitis were more at risk of dry eyes than those without posterior blepharitis or a shorter duration of diabetes mellitus.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

MF: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

SA & HN: Drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

HS & FA: Study design, data analysis, critical review, drafting the manuscript, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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